In the Claims:

Claims 1-10 (Cancelled).

11.   (New) A method of performing a Grover's quantum algorithm receiving a binary function having a basis of vectors of n qubits, the method comprising:

carrying out a superposition operation on input vectors for generating components of linear superposition vectors based upon a second basis of vectors of $n+1$ qubits;

carrying out an entanglement operation on components of the linear superposition vectors for generating components of numeric entanglement vectors, the entanglement operation generating, for components of each superposition vector, corresponding components of a numeric entanglement vector, each component based upon a respective vector of the second basis and being equal to one of the following

the corresponding component of the respective superposition vector if the binary function is null based upon the vector of the first basis formed by the first n qubits of the respective vector of the second basis, and

the opposite of the corresponding component of the respective superposition vector if the binary function is not a null; and

carrying out an interference operation on components of the numeric entanglement vectors for generating components of output vectors.

12.   (New) A method according to Claim 11, wherein the components of each output vector are even components, and

odd components of each output vector are obtained by inverting the even components.

13.   (New) A method according to Claim 11, wherein the components of each output vector are odd components, and even components of each output vectors are obtained by inverting the odd components.

14.   (New) A method according to Claim 11, wherein even or odd components of a numeric entanglement vector are obtained by carrying out the following operations:

encoding components of each linear superposition vector with a low logic value if negative and with a high logic value if positive for generating components of encoded superposition vectors;

generating for components of each encoded superposition vector corresponding components of an encoded entanglement vector, each component based upon a respective vector of the second basis and being obtained by

copying the corresponding component of the respective encoded superposition vector if the binary function is null in correspondence to the vector of the first basis formed by the first n qubits of the respective vector of the second basis, or

logically inverting the corresponding component of the respective encoded superposition vector if the binary function is not a null; and

decoding the components of encoded entanglement vectors for generating the components of numeric entanglement vectors.

15.   (New) A method according to Claim 14, wherein
each of the components of an encoded entanglement vector is
obtained by XORing the corresponding component of the encoded
superposition vector with a value of the binary function
corresponding to the vector of the first basis formed by the
first n qubits.

16.   (New) A method according to Claim 11, wherein
the interference operation comprises:

calculating a weighed sum with a scale factor of
even or odd components of a numeric entanglement vector; and

generating each even or odd component of an output
vector by respectively subtracting a corresponding even or odd
component of a numeric entanglement vector from the weighed
sum.

17.   (New) A method of performing a Deutsch-Jozsa's
quantum algorithm receiving a binary function having a basis
of vectors of n qubits, the method comprising:

carrying out a superposition operation on input
vectors for generating components of linear superposition
vectors based upon a second basis of vectors of $n+1$ qubits;

carrying out an entanglement operation on components
of the linear superposition vectors for generating components
of numeric entanglement vectors, the entanglement operation
generating, for components of each superposition vector,
corresponding components of a numeric entanglement vector,
each component based upon a respective vector of the second
basis and being equal to one of the following

the corresponding component of the respective

superposition vector if the binary function is null
based upon the vector of the first basis formed by
the first n qubits of the respective vector of the
second basis, and

the opposite of the corresponding component of
the respective superposition vector if the binary
function is not a null; and

carrying out an interference operation on components
of the numeric entanglement vectors for generating components
of output vectors.

18. (New) A method according to Claim 17, wherein
the components of each output vector are even components, and
odd components of each output vector are obtained by inverting
the even components.

19. (New) A method according to Claim 17, wherein
the components of each output vector are odd components, and
even components of each output vectors are obtained by
inverting the odd components.

20. (New) A method according to Claim 17, wherein
even or odd components of a numeric entanglement vector are
obtained by carrying out the following operations:

encoding components of each linear superposition
vector with a low logic value if negative and with a high
logic value if positive for generating components of encoded
superposition vectors;

generating for components of each encoded
superposition vector corresponding components of an encoded
entanglement vector, each component based upon a respective

vector of the second basis and being obtained by

copying the corresponding component of the
respective encoded superposition vector if the
binary function is null in correspondence to the
vector of the first basis formed by the first n
qubits of the respective vector of the second basis,
or

logically inverting the corresponding component
of the respective encoded superposition vector if
the binary function is not a null; and

decoding the components of encoded entanglement
vectors for generating the components of numeric entanglement
vectors.

21.   (New) A method according to Claim 20, wherein
each of the components of an encoded entanglement vector is
obtained by XORing the corresponding component of the encoded
superposition vector with a value of the binary function
corresponding to the vector of the first basis formed by the
first n qubits.

22.   (New) A quantum gate for running a Grover's
quantum algorithm and comprising:

an input for receiving a binary function having a
basis of vectors of n qubits;

a superposition subsystem connected to the input for
carrying out a superposition operation on components of input
vectors for generating components of linear superposition
vectors based upon a second basis of vectors of $n+1$ qubits;

an entanglement subsystem connected to said
superposition subsystem for carrying out an entanglement

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operation on components of the linear superposition vectors
for generating components of numeric entanglement vectors,
said entanglement subsystem comprising

a command circuit generating a plurality of
logic command signals encoding values of the binary
function corresponding to the vectors of the first
basis, and

circuit means being input with the logic
command signals and generating for components of
each superposition vector corresponding signals
representing components of a numeric entanglement
vector, each component referred to a respective
vector of the second basis is equal to at least one
of the following

the corresponding component of the
respective superposition vector if the binary
function is null in correspondence to the
vector of the first basis formed by the first n
qubits of the respective vector of the second
basis, and

the opposite of the corresponding
component of the respective superposition
vector if the binary function is not a null;
and

an interference subsystem connected to said
entanglement subsystem for carrying out an interference
operation on components of the numeric entanglement vectors
for generating components of output vectors.

23.   (New) A quantum gate according to Claim 22,
wherein said circuit means encodes components of each linear

superposition vector with a low logic value if negative and
with a high logic value if positive for generating signals
representing components of an encoded superposition vector,
said circuit means comprising:

an array of XOR logic gates each input with a signal
representing a component of an encoded superposition vector,
and with a relative logic command signal for generating
voltage signals representing components of encoded
entanglement vectors; and

an array of digital/analog converters that decodes
components of the encoded entanglement vectors for generating
signals representing corresponding components of numeric
entanglement vectors.

24.   (New) A quantum gate according to Claim 23,
wherein each digital/analog converter outputs a signal
representing the weighed difference with a second scale factor
between the component of encoded entanglement vectors and a
reference value.

25.   (New) A quantum gate according to Claim 22,
wherein said interference subsystem comprises:

an adder being input with voltage signals
representing even or odd components of a numeric entanglement
vector, and generating a summed signal representing a weighed
sum with a scale factor of the even or odd components; and

an array of adders each being input with a
respective signal representing an even or odd component,
respectively, of a numeric entanglement vector and with the
summed signal for generating a signal representing an even or
odd component, respectively, of the output vector as the

difference between the summed signal and the signal
representing an even or odd component of a numeric
entanglement vector.

26.   (New) A quantum gate for running a Deutsch-
Jozsa's quantum algorithm and comprising:

an input receiving a binary function having a basis
of vectors of n qubits;

a superposition subsystem connected to the input for
carrying out a superposition operation on components of input
vectors for generating components of linear superposition
vectors based upon a second basis of vectors of $n+1$ qubits;

an entanglement subsystem connected to said
superposition subsystem for carrying out an entanglement
operation on components of the linear superposition vectors
for generating components of numeric entanglement vectors,
said entanglement subsystem comprising

a command circuit generating a plurality of
logic command signals encoding values of the binary
function corresponding to the vectors of the first
basis, and

a circuit being input with the logic command
signals and generating for components of each
superposition vector corresponding signals
representing components of a numeric entanglement
vector, each component referred to a respective
vector of the second basis is equal to at least one
of the following

the corresponding component of the
respective superposition vector if the binary
function is null in correspondence to the

vector of the first basis formed by the first n
qubits of the respective vector of the second
basis, and

the opposite of the corresponding
component of the respective superposition
vector if the binary function is not a null;
and

an interference subsystem connected to said
entanglement subsystem for carrying out an interference
operation on components of the numeric entanglement vectors
for generating components of output vectors.

27.   (New) A quantum gate according to Claim 26,
wherein said circuit encodes components of each linear
superposition vector with a low logic value if negative and
with a high logic value if positive for generating signals
representing components of an encoded superposition vector,
said circuit comprising:

an array of XOR logic gates each input with a signal
representing a component of an encoded superposition vector,
and with a relative logic command signal for generating
voltage signals representing components of encoded
entanglement vectors; and

an array of digital/analog converters that decodes
components of the encoded entanglement vectors for generating
signals representing corresponding components of numeric
entanglement vectors.

28.   (New) A quantum gate according to Claim 27,
wherein each digital/analog converter outputs a signal
representing the weighed difference with a second scale factor

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between the component of encoded entanglement vectors and a
reference value.

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